

**SINGLE SPEED TURBINE GENERATOR FOR DIFFERENT POWER
SYSTEM OUTPUT FREQUENCIES IN POWER GENERATION SYSTEMS
AND ASSOCIATED METHODS**

Abstract Of The Disclosure

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A power generation system (10) and associated methods to compensate for different power system output frequencies are provided. The system (10) preferably includes a turbine (12) having a turbine rotor (13) positioned to rotate at a preselected rotational frequency and a generator (20) positioned to generate a power system output current at a preselected power system frequency. The generator (20) preferably has a generator stator (22) and a generator rotor (25) positioned within the generator stator (22) to induce electromotive force to the generator stator (22). The generator rotor (25) preferably is coupled to the turbine rotor (13) and driven by the turbine rotor at substantially the same preselected rotational frequency. The system (10) also preferably includes a frequency differentiator (30) coupled to the generator rotor (25) and connected to the power system electrical current output to differentiate between the preselected power system output frequency and the preselected rotational frequency of the generator rotor (25) so that variations in the preselected power system output frequency appear as variations in the generator rotor alternating electrical current frequency.